

Performance Assurance and M&V for UESC Projects

Virginia Natural Gas

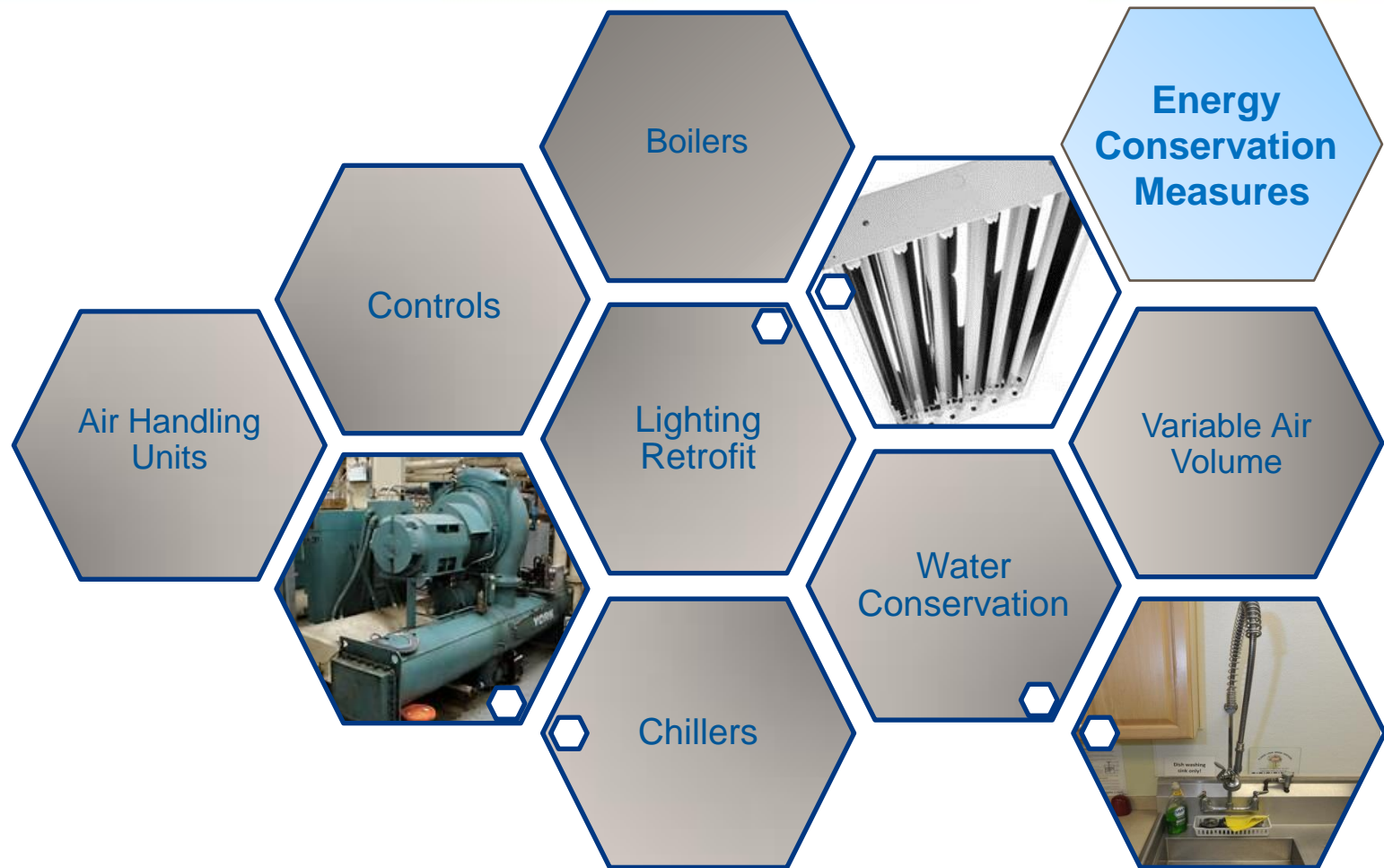
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Customer Situation



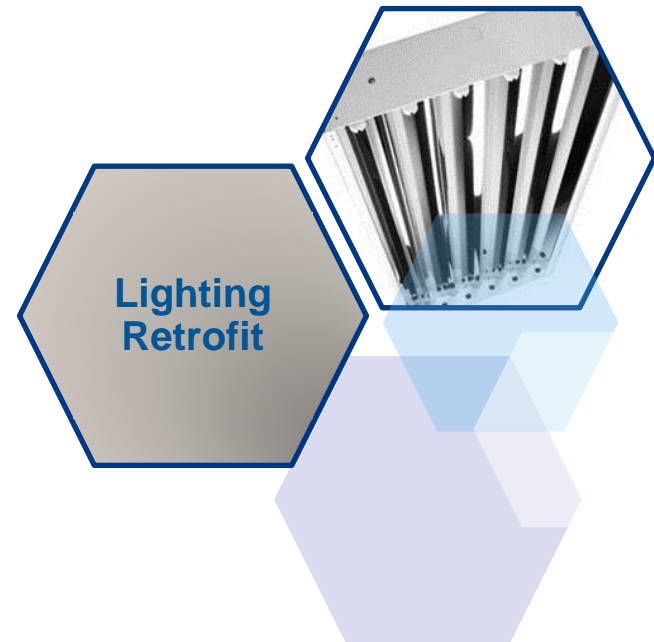
Energy Conservation Measures



Lighting Retrofit

Savings variables:

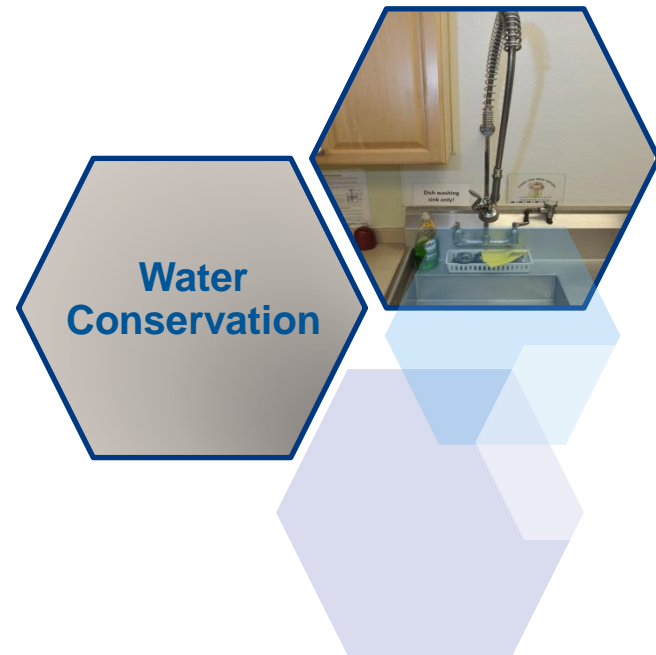
- Δ Power draw
- Δ Burn hours
- Δ % Burn outs
- Δ Electricity Cost



Domestic Water Conservation

Savings variables:

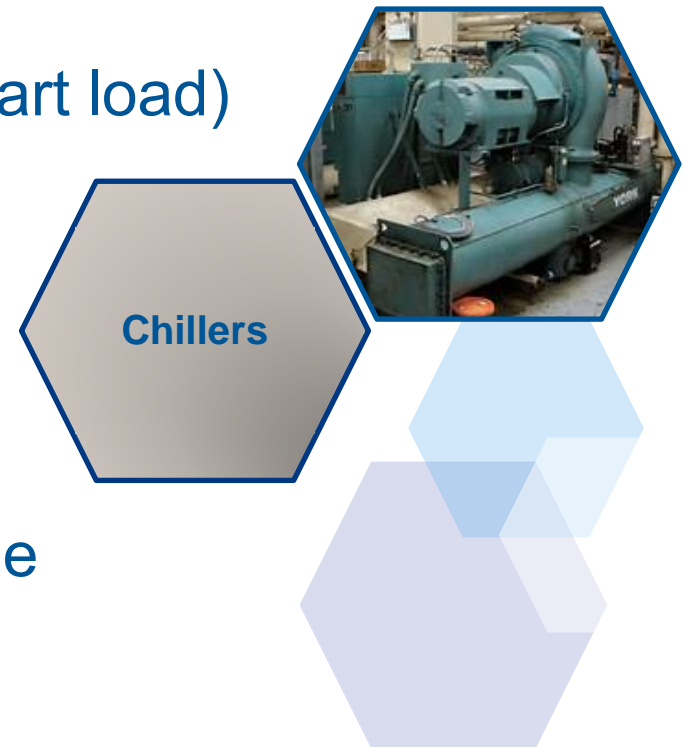
- Δ Fixture flow rate
- Δ Frequency of use
- Δ Hot/cold water use
- Δ Water/Sewer Cost



Chiller Replacement

Savings variables:

- △ Equipment efficiency (full & part load)
- △ Building load
- △ Weather
- △ Controls strategies
- △ Hours of operation
- △ System deterioration over time
- △ Electricity/Fuel Cost



Customer Situation



Personnel

Considerations:

- In house expertise
- Man-hours available
- Turn-over and training
- Ability to validate savings



Customer Situation



Reporting Requirements

Considerations:

- Federal guidelines
- Methodology and frequency
- How to address changes in mission/ facility use



Customer Situation



Savings Ownership

Considerations:

- Long term plans for facility
- Changes in facility operation
- Recourse in case of shortfall
- Funding options
- Responsibility for corrective actions



Customer Situation



Metering Infrastructure

Considerations:

- Utility meters and sub-meters
- Control points
- Historical baseline
- Reasonable expense to measure savings



Customer Situation



Operations and Maintenance

Considerations:

- In-house or outsourced
- Preventative vs. reactive
- Commissioning
- Opportunity to maximize efficiency over time and adjust to changes



Customer Situation



Savings Validation

Goal is to prove new equipment is able to generate savings, however savings are calculated based on agreed upon conditions:

- Baseline building use and operation
- Typical weather
- Utility rates
- Proper equipment maintenance
- Control strategies and set-points

More than comparing pre/post BTUs and dollars

How should we validate savings?



Performance Assurance Strategies


FEMP Federal Energy Management Program
Fact Sheet

Leading by example,
saving energy and
taxpayer dollars in
federal facilities

Performance Assurance for Multi-Year Contracts Under the Utility Incentive Program


Section 152(f) of the Energy Policy Act of 1992 (EPACT) Public Law 102-486 authorized and encouraged Federal agencies to participate in programs to increase energy efficiency and for water conservation or the management of electricity demand conducted by gas, water, or electric utilities. Additionally Title 10 Section 2913 and 10 USC 2866 (a) authorizes and encourages Defense facilities to participate in utility programs for the management of electricity demand, and energy and water conservation.

Since these contracts are for utility services under section 201 of the Federal Property and Administrative Services Act of 1949, the only financial requirement on Federal agencies is the obligation of the annual costs for such contracts during each year that the contract is in effect. There is no statutory requirement for annual measurement and verification of the energy, water, or cost savings, or a contractual guarantee of those savings as there is for energy savings performance contracts in Section 801 of the EPACT. However, prudent Federal energy program management requires that the continuing performance of the equipment secured and techniques applied under these contracts be assured to



accomplish the expected energy and/or water usage and cost reductions.

An action plan to assure the specified performance and efficiency of the equipment installed, and the expected level of operations and maintenance necessary to assure achievement of the annual estimated savings throughout the contract period, is a reasonable expectation. This is considered the recommended level of prudent program management for these contracts.

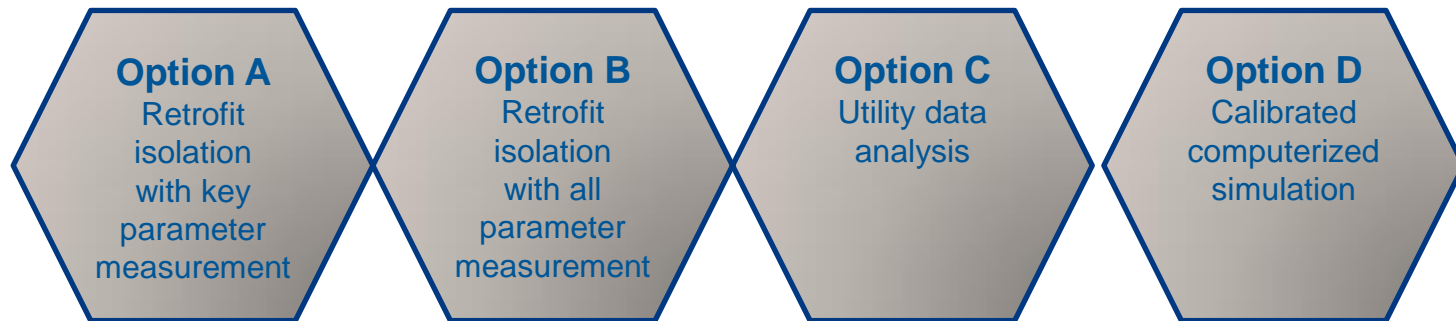


U.S. Department of Energy
**Energy Efficiency
and Renewable Energy**
Bringing you a prosperous future where energy
is clean, abundant, reliable, and affordable

- Start-up performance verification (based on measured data)
- Performance verification at end of warranty period (based on measured data)
- Operations and maintenance training
- Continuing training
- Periodic inspections and verification of appropriate O&M performance
- Performance discrepancy resolution
- On going metering and continuous commissioning for complex projects

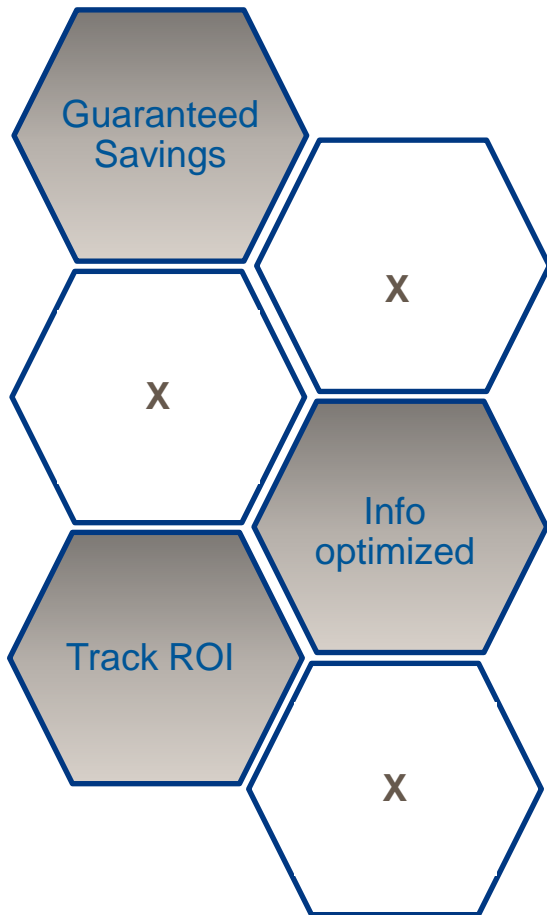
Measurement and Verification (M&V)

- M&V is one of the PA strategies (term confusion)
- FEMP protocol



- Historically included in ESPC projects:
 - Legal requirement for guaranteed savings
 - Agreed upon methodology to determine if ESCO met their obligation
 - M&V validates previous performance (retroactive)

Measurement and Verification (M&V)



Provides:

- ✓ recourse on ESPC contracts (guaranteed savings)
- ✓ data to report energy efficiency status / track project ROI
- ✓ information that can be leveraged to optimize/correct systems

Does not provide:

- × corrective actions in case of non-performance (separate step)
- × remedy for unrealized savings due to changes in weather, rates, operation, etc.
- × system optimization over time

Cost benefit balance

“The appropriate performance assurance and rigor of the M&V method necessary to cost effectively assure compliance with that specified in the contract must be at the discretion of the individual contracting officer.” - FEMP



Effective Performance Assurance Plan

- Customized to agency requirements and nature of ECMs implemented (savings certainty)
- Leverage existing metering and controls infrastructure to develop cost effective plan
- Incorporate site/staff requirements and future plans for facility
- Apply short and long term strategies
- Provides agency with tools to track energy savings (compliance)

Performance Assurance Plan Components

Short term strategies – ensures potential to perform

Utilize metering to develop solid baselines

Validates engineering calculations with attention to stipulations/assumptions

Start-up TAB and commissioning

Warranty provisions

Long term strategies – maximizes performance over time

Leverage control system and metering

On going Cx to maximize performance of equipment to changing conditions

O&M

Training



AGL Resources

Performance Assurance Services

- Based on agency programmatic requirements and project goals
- Project specific plan establishes services to be performed and obligations of each party
- Cost effective PA plan typically includes:
 - ✓ Full system commissioning at the end of construction to ensure that all project measures are functioning as designed.
 - ✓ Measurement & Verification (M&V) where it makes sense
 - ✓ Leverages control system to validate savings
 - ✓ On-going commissioning to ensure projects savings persist
 - ✓ Staff Training

Thank You!

